



Role of manufacturing flexibility in managing duality of formalization and environmental uncertainty in emerging firms

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ABSTRACT

Increased firm formalization helps emerging firms develop stable routines and processes to increase their chances of survival. However, uncertain and dynamic task environments of emerging firms require more flexible organizational structures. Such duality of structural prescriptions stems from competing demands of task and institutional environments. We propose that manufacturing flexibility could help decouple activities required in task environments from those required in institutional environments, thereby mitigating the conflict of adopting flexible and rigid structures at the same time. An emerging venture could meet demands of institutional environments through formalized structures, and use manufacturing flexibility to address needs of task environment in order to mitigate liabilities of newness. Using a sample of 167 high-technology manufacturing firms in the UK, we use a moderated polynomial regression approach to test the proposed framework. Results indicate that formalized structures in conjunction with manufacturing flexibility lead to enhanced performance. The findings extend literature on organizational structures in operations management and entrepreneurship.

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1. Introduction

Emerging firms must acquire resources, establish boundaries, and engage in exchanges within the environment (Katz and Gartner, 1988). In order to realize such exchanges, they must perform transactions with stakeholders in institutional and task environments. Institutional environments confer legitimacy to new firms, whereas task environments facilitate the exchange of inputs and outputs (Aldrich, 2007). Due to the different contexts of institutional and task environments, different organizational structures may be necessary to effectively operate in respective environments. Contingency theory follows this principle, “guided by the general orienting hypothesis that organizations whose internal features (i.e., structure) best match the demands of their environments will achieve the best adaptation” (Scott and Davis, 2007, pp. 89).

Formal structures are important for enhancing legitimacy among institutional stakeholders through increased stakeholder accountability, routine and process development, and understanding of the initial environment (Weick, 2001). Legitimacy refers to norms a venture must follow to establish itself as a firm. For example, not developing formal accounting statements, or adopting radically different organization mode, could lead to doubts in minds of institutional stakeholders about the legitimacy of the

venture. Ventures establish legitimacy by adopting the traditionally expected characteristics of a firm that are accepted regulatory, social and cultural norms (DiMaggio and Powell, 1991). For example, value of writing a business plan is questioned in dynamic contexts of ventures. Yet writing a business plan is an institutional requirement to increase legitimacy of a venture. Hannan and Freeman (1977) argue that emerging firms must develop stable routines and processes by adopting more rigid structures because the direct and indirect cost of adaptation to particular environments could be too high. Furthermore, with increased accountability, stakeholders in the task environment are more likely to engage in exchanges with more legitimate emerging firms (Chrisman et al., 1998).

However, task environments demand organic structures to ensure organizational flexibility in the face of uncertain, complex, and dynamic environments. Firms must create, manufacture and distribute new products with changing environmental needs. With increased environmental uncertainty, a venture must be resilient to shocks in the task environment. An organic structure can help a firm to cope with demand, technological, and competitive uncertainty, which make it particularly challenging to engage in reliable exchanges with task environment stakeholders (Tushman and Anderson, 1986). Unpredictability in demand makes it difficult to predict sales and allocate resources efficiently in ventures suffering from liabilities of smallness. Technological uncertainty makes it difficult to sustain and develop reliable routines to convert inputs to outputs. Furthermore, competitive uncertainty makes

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it difficult for ventures to predict and assess competitive actions and commitments. A less formalized structure could enable a venture to mitigate threats from uncertainty and to engage in reliable exchanges in the task environment.

Aldrich (2007) provides theoretical conceptualizations for the necessity of formalization to meet the needs of institutional environments. Sine et al. (2006) offer empirical support for the necessity of formalization to meet the demands of institutional environments in order to ensure a venture's survival. However, in uncertain environments, contingency theory would suggest using organic structures to meet the needs of the task environment. Prior research has not addressed how ventures deal with the competing demands of formal and organic structures. By addressing the dual necessities of increased formalization required from institutional environments and organic structures required by task environments, ventures greatly enhance their performance. This leads to two research questions: (a) Is it possible to decouple conflicting structural requirements? and (b) How can such dual structural requirements be, in fact, complementary? Ventures must accommodate conflicting demands from task and institutional environments to further enhance their performance. Meyer and Scott (1983, p. 140) define task environments as 'those within which a product or service is exchanged in a market such that organizations are rewarded for effective and efficient control of the work process.' Institutional environments are 'elaboration(s) of rules and requirements to which individual organizations must conform if they are to receive support and legitimacy from the environment'.

2. Theoretical development and hypotheses

The ability to manage this structural duality could be critical for new ventures. With increasing environmental uncertainty, more formalized structures may be required by institutional stakeholders, yet less formalized structures are required by task environment stakeholders. How can emerging firms have the best of both worlds? To address this question, Meyer and Rowan (1977) put forth a proposition of decoupling¹ formal structures from technical cores, and Adler and Borys (1996) proposed 'enabling bureaucracy.' Although Meyer and Rowan (1977) suggest that decoupling results in mutual exclusivity between formal structures and technical cores, recent theoretical extensions by Adler and Borys (1996) suggest that formal structures, when managed by increasing options for tools, tasks, and routines through enhanced connectivity across the firm, could actually complement formal structures. Thus, decoupling could be leveraged through the use of mechanisms that bridge formal structures and technical cores.

A potential mechanism that could help ventures increase returns from decoupling formal structures from technical cores could be the enhanced manufacturing flexibility. "Manufacturing flexibility" refers to a firm's capability to meet changes in market demands through integrated and coordinated operational policies (Pagell and Krause, 2004). Nemetz and Fry (1988, p. 629) state that "flexibility is a measure of a firm's ability to respond to market demands by switching from one product to another through coordinated policies and actions."² Operations management literature suggests that firm structure is independent of manufacturing flexibility (Gerwin, 1993), and thereby supports the feasibility of decoupling the technical core of the firm from the institutional

environment. In order to assess whether formalization and flexibility could coexist, one must first establish that (a) manufacturing flexibility and firm formalization are independent, and (b) they are mutually reinforcing, to enhance returns.

Manufacturing flexibility and formalization could in fact be complementary, thus further increasing the economies of scope in managing their duality (e.g., Adler et al., 1999). Formalization can help firms to effectively channel their focus and adapt more effectively to their environment (Adler and Borys, 1996). Adler and Cole (1993) explain both the enabling and limiting properties of bureaucracy. Bureaucracy consists of a "dense web of rules and a finely differentiated vertical and horizontal division of labor with high levels of trust and community cohesion" (Adler and Borys, 1996, p. 670). For example, firms with a cost leadership strategy exhibit characteristics of a rigid bureaucracy to control costs. Enabling bureaucracy, on the other hand, enhances the effectiveness of tasks, tools, and routines through the horizontal and vertical division of labor. Therefore, compared to traditional notions of bureaucracy (i.e., limiting bureaucracy), enabling bureaucracy addresses the duality of efficiency through the division of labor, and effectiveness through increased trust and solidarity. In the current context, internal formalization not only can help ventures gain more resources from the institutional environment as they meet the needs of the task environment (Grewal and Dharwadkar, 2002), but can help ventures become more flexible. Supporting this argument, Briscoe (2007) finds that increased formalization can increase flexibility. In the context of new venture operations, formalization helps in the following ways: (a) increasing participation from suppliers and buyers when they perceive lower cooperation and coordination costs, (b) standardizing manufacturing practices, allowing internal product and process changes to be made more easily due to reduced causal ambiguity stemming from increased formalization, and (c) enhancing internal and external knowledge sharing, hence helping to develop common symbols and language to more effectively meet the demands of the environment. Alternatively, increased flexibility could help ventures to adapt exchange routines through formal structures. Manufacturing flexibility helps firms to cope effectively with environmental uncertainty (Swamidass and Newell, 1987).

To assess whether the joint presence of formalized structures and manufacturing flexibility lead to better performance, we examine whether at higher levels of formalization (required at higher levels of uncertainty), higher levels of manufacturing flexibility enhance venture performance. Greater environmental uncertainty could call for greater formalization (Sine et al., 2006), and for greater manufacturing flexibility to meet changing demands. Thus, more formal structures and high manufacturing flexibility would be more important for venture performance at high levels of environmental uncertainty.

2.1. Contingency theory and the notion of fit

Contingency theory is the most widely used theoretical approach in the study of organizations (Walsh et al., 2006). Scott and Davis (2007) add that the best way to organize depends on the nature of the firm's environment, since failure to meet the contextual conditions by adapting the internal structure results in lower performance. Different subunits within an organization may confront different external demands. "To cope with these various environments, organizations create specialized subunits with differing structural features" (Scott and Davis, 2007, pp. 89). For example, there may be different loci of formalization, both centralized and decentralized. Common structural characteristics typically explored using contingency theory includes strategy, formalization, administrative intensity, decentralization, and structural differentiation. The more dynamic the environment, the more organic the structure of the organization should be in

¹ Decoupling affords a unique opportunity to exclusively deal with task and institutional environment. As suggested by Meyer and Rowan (1977), bridging the formal and technical cores could lead to inefficiencies.

² We thank the editor Jayanth Jayaram for bringing Nemetz and Fry's work to our attention.

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